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BEFORE THE POSTAL REGULATORY COMMISSION WASHINGTON, D.C. 20268–0001

PERIODIC REPORTING (PROPOSAL TWO)	Docket No. RM2018-5

RESPONSES OF THE UNITED STATES POSTAL SERVICE TO QUESTIONS 1-19 OF CHAIRMAN'S INFORMATION REQUEST NO. 1 (June 29, 2018)

The United States Postal Service hereby provides its responses to the abovelisted questions of Chairman's Information Request No. 1, issued June 18, 2018. The questions are stated verbatim and followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorney:

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475 L'Enfant Plaza West, S.W. Washington, D.C. 20260-1137 (202) 277-6333 June 29, 2018

- 1. Please refer to Library Reference USPS-RM2018-5/1, Preface.¹
 - a. The table shows that the folder "DATA" contains an Excel file "IOCSDataDictionary_IOCSCluster.xls" listing all of the variables in the IOCS-Cluster data set. Library Reference USPS-RM2018-5/1, Preface at 4. However, the IOCS-Cluster SAS data set filed in Library Reference USPS-RM2018-5/1 and Library Reference USPS-RM2018-5/NP1 does not contain all of the variables listed in the IOCS cluster data dictionary.

 Id. Please file a version of the Proposal Two IOCS-Cluster SAS dataset that includes all of the variables listed in the Library Reference USPS-RM2018-5/1. Excel file "IOCSDataDictionary IOCSCluster.xls."
 - b. Please also include in the SAS dataset provided in response to question 1.a. directly above, the actual values rather than masked values for the following variables that have been recoded or for which identifying record information was omitted:³
 - i. finance number in the "FinanceNum" variable
 - ii. "TestID" variable
 - iii. TestZone variable⁴
 - iv. "Q16B02B" ("ZIP Code of Route") variable⁵
 - v. "Q23D01" ("Domestic or Foreign Destination") variable⁶
 - vi. "Q23D02" ("Destination ZIP Code") variable recoded⁷
 - c. The Preface table also shows that the folder "SASPrograms" includes the Proposal Two SAS programs. *Id.* at 4. Please provide all inputs, including

¹ See Library Reference USPS-RM2018-5/1, May 25, 2018, PDF file "Prop.2.Fldr.1.Preface.pdf," (Preface).

² Without the SAS data variables, input data files, the SAS program code and methodology under Proposal Two cannot be directly evaluated or replicated. Mainframe SAS programs can be adapted to PC SAS with the same information.

³ See *id.* at 4-5. The Postal Service states that the SAS "data files contain IOCS-Cluster data elements that would be used for the development of the CRA. It was developed by dropping variables that would not be used in the development of the CRA, and recoding variables containing sensitive information." *Id.* at 4. However, the dropped, recoded and masked data variables are necessary to directly assess the impact and compare the proposed sample design differences.

⁴ It appears that the "TestZone" variable was also masked as the recoded test zone portion of the "TestID" variable aligns with the "TestZone" variable values.

⁵ The IOCS cluster data dictionary states that "Q16B02B" variable is the ZIP Code of the route. See Library Reference USPS-RM2018-5/1, Excel file "IOCSDataDictionary_IOCSCluster.xls," tab "Mainframe Layout."

⁶ The Preface describes the "Q23D01" variable as "the delivery zone of the mailpiece." Preface at 5. However, it appears that the Postal Service may have intended to list "Q23D02" rather than "Q23D01."

datasets and macro definitions, needed for the SAS code processing in each of the following Proposal Two SAS programs:⁸

- i. "CL101"
- ii. "CLCARMM"
- d. In Library References USPS-RM2018-5/1 and USPS-RM2018-5/NP1, folders "Workbooks," the Postal Service also included Excel files containing estimates produced by using the recently approved Proposal Five methodology for quarter 4 of FY 2017 and quarter 1 of FY 2018.⁹ Please provide the SAS datasets used to produce the public and non-public Proposal Five IOCS estimates.¹⁰
- e. For the Proposal Five SAS datasets provided in response to question 1.d. directly above, please provide the actual values in the variable fields rather than masked values if the Postal Service has recoded or dropped:
 - i. the finance number
 - ii. the office name, city and state
 - iii. the area code
 - iv. the route ZIP Code
 - v. the destination ZIP Code of the mail piece
- f. Please provide the Proposal Five methodology FY 2017 quarter 4 and FY 2018 quarter 4 input files, "TACSCAG" (summary of TACS workhours) and "POEXP" (quarterly cost control totals) used to develop adjustments to the IOCS sample cost weights.¹¹

RESPONSE:

The requested data are provided under seal in USPS-RM2018-5/NP2.

 $^{^{\}rm 8}$ Mainframe SAS program code can be adapted to PC SAS program code.

⁹ See Library Reference USPS-RM2018-5/1, folder "Workbooks," Excel files "CS06&7-FY17Q4.CurrentwithProp5.xlsx," "CS06&7-FY18Q1.CurrentwithProp5.xlsx," "I_FORMS_FY17Q4-CurrentwithProp5.xlsm," and "I_FORMS_DY18Q1-CurrentwithProp5.xlsx;" Docket No. RM2017-9, Order on Analytical Principles Used in Periodic Reporting (Proposal Five), February 6, 2018 (Order No. 4399). ¹⁰ For use in the "PCCARMM16ByRouteType_TACSAdjPub" SAS program code. See Docket No. RM2017-9, Library Reference USPS-RM2017-9/1, August 9, 2017, folder "SASPrograms."

¹⁰ For use in the "PCCARMM16ByRouteType_TACSAdjPub" SAS program code. See Docket No. RM2017-9, Library Reference USPS-RM2017-9/1, August 9, 2017, folder "SASPrograms."

¹¹ See Docket No. RM2017-9, Library Reference USPS-RM2017-9/1, August 9, 2017, PDF file "RM2017.9_1.Preface.pdf," at 1.

- 2. In Docket No. ACR2017, Library References USPS-FY17-37 and USPS-FY17-NP21, the Postal Service provided the IOCS datasets without the Proposal Five methodology.¹²
 - a. Please provide an electronic file that has a key for each of the masked finance numbers provided in the Docket No. ACR 2017 IOCS SAS dataset that links the recoded finance number to the actual finance number and includes the office's name, area code, city and state. 13
 - b. If the ZIP Code of the route in the Docket No. ACR 2017 IOCS SAS dataset is also in a masked form, please provide the SAS code used to recode the actual route ZIP Code values.¹⁴

RESPONSE:

The requested data are provided under seal in folder USPS-RM2018-5/NP2.

¹² Docket No. ACR2017, Library Reference USPS-FY17-37, December 29, 2017; Docket No. ACR2017, Library Reference USPS-FY17-NP21, December 29, 2017. The Proposal Five methodology was approved after the Postal Service's FY 2017 ACR filing. See Order No. 4399.

¹³ See Docket No. ACR2017, Library Reference USPS-FY17-37, PDF file "USPS-FY17-37.Preface.pdf," at 13.

¹⁴ Alternatively, the Postal Service may file a revised Docket No. ACR2017, Library Reference USPS-FY17-NP21 IOCS SAS dataset that includes the information request in part a. of this question and contains the actual route ZIP Code values.

- 3. The Postal Service states that for sampling mode 1, morning tests clustered by zone/on-site, "Zones are selected randomly in proportion to their size, measured as their number of DOIS city carrier hours." Petition, Proposal Two at 5.
 - a. Please confirm that the number of DOIS city carrier hours referred to in this question preface is the total number of DOIS city carrier hours in Labor Distribution Codes (LDCs) 21, 22, 23, 24, 26, 27, 28, 29 and 92. If not confirmed, please specify which LDC workhours are summed for the number of city carrier hours used for sampling mode 1, and the basis for the selection.
 - b. Please confirm that the LDC workhours used to measure the size of each zone are those clocked in the entire 24-hour day. If not confirmed, please identify the time span used.

RESPONSE:

a. Not confirmed. DOIS includes workhours for LDCs 21, 22, 23, 26, 27 and 29, and does not include workhours for LDCs 24, 28 or 92. Hours for LDCs 23 and 27, in particular, are underreported in DOIS compared to TACS. For IOCS-Cluster sample selection, only DOIS workhour records with valid combinations of finance number and ZIP Code are used. In FY17Q4, TACS had 95M workhours in total for all of the LDCs utilized in Proposal Five, of which 93M were in LDCs recorded in DOIS. IOCS-Cluster utilized 88M hours from DOIS, or 93 percent of total TACS hours used in the final IOCS-Cluster weighting.

b. Confirmed.

¹⁵ The Proposal Five methodology uses city carrier workhours clocked to these Time and Attendance Collection System (TACS) LDCs. See Order No. 4399 at 4.

- 4. The Postal Service states that for sampling mode 3, afternoon telephone readings, "[t]he first-stage sampling unit is the district. Districts are selected in proportion to the number of carrier DOIS hours." Petition, Proposal Two at 23.
 - a. Please confirm that the number of DOIS city carrier hours referred to in this question preface is the total number of DOIS city carrier hours in Labor Distribution Codes (LDCs) 21, 22, 23, 24, 26, 27, 28, 29 and 92. If not confirmed, please specify which LDC workhours are summed for the number of carrier hours used for sampling mode 3, and the basis for the selection.
 - b. Please confirm that the LDC workhours are those clocked in the entire 24-hour day. If not confirmed, please identify the time span used.

RESPONSE:

- a. Not confirmed. Please see the response to question 3.a of this Information Request.
- b. Confirmed.

- 5. The Postal Service states "[f]or the afternoon, sampling data from all afternoon tests are scaled to the total hours in the afternoon. These are not estimated by CAG separately because there are insufficient afternoon tallies " *Id.* at 7.
 - a. Given that street time is the largest portion of city carrier time and cost, please discuss the reasons why under the Proposal Two methodology, "there are insufficient afternoon tallies"
 - b. Are there "insufficient afternoon tallies" by CAG under the current IOCS methodology? If so, please discuss the reasons why. If not, please discuss the methodological differences under the Proposal Two methodology that resulted in "insufficient afternoon tallies" and not in the current methodology.

RESPONSE:

a. In the afternoon, carriers are generally not handling mail. Rather, they are usually on the street (about 97 percent of the time), and even when in the office (about 3 percent of the time) in the afternoon, they are usually not handling mail. Because so little of their time is handling mail, and because there is such a low percentage of direct tallies where a mailpiece is obtained, the primary goal of afternoon sampling in IOCS-Cluster is to contribute to the estimate of the percentage of street time.

In afternoon tests, all carriers at IOCS panel offices within the district are included for sampling, and all have the same probability of selection. Because there are very few carriers in smaller offices and these are not sampled at higher sampling rates, the probability of obtaining sufficient readings on carriers from small CAG offices is low.

b. In the current IOCS methodology, there are about 30,000 readings on carriers per guarter in the afternoon. This is sufficient to estimate costs by CAG, route type and

craft subgroup, particularly since these are combined with morning readings when estimating costs.

By contrast, IOCS-Cluster has only about 5,000 afternoon readings per quarter, and because these are all in a separate IOCS-Cluster stratum, they cannot be directly combined with the morning tests when developing estimates. Furthermore, all carriers in IOCS panel offices have the same probability of selection, unlike current IOCS where the sampling rate is much higher for small compared to large panel offices.

IOCS-Cluster continues to use the IOCS panel for afternoon sampling because of the requirement that respondents need to be informed about IOCS and trained in how to answer IOCS questions. As a consequence, the number of readings on carriers in small offices is low. As shown in the table below, there was only one reading on a CAG H office in FY18Q1. However, because 97 percent of the estimated costs in the afternoon are on the street rather than in-office, little accuracy is lost by not attempting to estimate these costs separately by CAG.

Count of afternoon non-stop readings by CAG

SampleCAG	17Q4	18Q1	
А	938	968	
В	420	396	
С	425	484	
D	125	120	
E	114	93	
F	19	14	
G	8	9	
Н	3	1	
Grand Total	2,052	2,085	

- 6. For the telephone afternoon tests, the Postal Service states that its "data collection software randomly selects 30 carriers from IOCS panel offices across the district, and then groups these 30 by finance number" (effective in FY 2018, quarter 1) and in FY 2017 quarter 4, "carrier readings were sequenced randomly and not grouped by office" *Id.* at 7 n.9. For all city carrier afternoon tests, both the public and non-public filed Proposal Two SAS datasets use the same ("777777"-not identifiable as a specific office) finance number in the "FINANCENUM" variable field and use the same value ("X"- not identified as a specific CAG-level for the office) in the "NEWWEIGHT_CAG" variable field.¹⁶
 - a. Please provide a key for the afternoon tests showing how to identify actual finance number and sampled office CAG-level in each of the readings in the Proposal Two SAS datasets.
 - b. Please also provide a key or specify how the actual district sampled can be identified in the Proposal Two SAS datasets, and include the district names for the values used.

RESPONSE:

The requested key that maps from the TestID and SeqNo fields to the CAG and district is provided under seal in folder USPS-RM2018-5/NP2.

¹⁶ See Preface at 5; Library Reference USPS-RM2018-5/1, Excel file "IOCSDataDictionary_IOCSCluster.xls," tab "Mainframe Layout."

7. In Docket No. ACR2016, Library Reference USPS-FY16-37, Preface, the Postal Service states that to reflect Order No. 2387, it added a new variable, "RPT_CAG" to the IOCS dataset to enable separate reporting of CAG K and L offices from CAG H and J offices in the same strata. The IOCS SAS data sets filed under Proposal Two do not include that same named variable and the IOCS cluster data dictionary does not identify CAG codes J, K, and L options in any of the CAG-related variables listed. Please specify how to distinguish offices in CAG-levels J, K, and L from offices in CAG H and J for both morning and afternoon readings in the Proposal Two SAS datasets.

RESPONSE:

Please see the dataset provided in response to Question 1.a of this Information

Request for the variables that have the CAG of the morning readings. In addition, for afternoon readings, please see the workbook provided in response to Question 6 of this Information Request that provides a key mapping tallies to the corresponding office CAG.

¹⁷ See Docket No. ACR2016, Library Reference USPS-FY16-37, December 29, 2016, PDF file "USPS-FY16-37.pdf," at 1. To ensure sufficient representation of CAG K-L post offices in the combined IOCS strata approved in Order No. 2837, the Commission directed the Postal Service to submit details of the combined IOCS sample selection separately for CAG K-L offices until directed otherwise in an Annual Compliance Determination or Commission order. See Docket No. RM2015-19, Order Approving Analytical Principles Used in Periodic Reporting (Proposal Ten), November 24, 2015, at 10 (Order No. 2837).

¹⁸ See Library Reference USPS-RM2018-5, Excel file "IOCSDataDictionary_IOCSCluster.xlsx," tab "Mainframe Layout." The Postal Service describes Proposal Two as a "Proposal to Change the In-Office Cost System for City Carriers." Petition, Proposal Two at 1. However, the filed data sets also contain collected information for the craft code "Clerks" and "Supervisors."

8. Please refer to Library Reference USPS-RM2018-5/1, Excel file "Prop.2.IOCS.Cluster.Impact_Public.xlsx." For all hardcoded numbers in columns D-E, G, N-O, and U-V, please provide direct links or references to the input data files.

RESPONSE:

The requested workbook, Prop.2.IOCS.Cluster.Impact_Public_CHIR1q8.xlsx, is provided in folder USPS-RM2018-5/2.

9. The Postal Service states that for morning tests, the frame for the first-stage sampling "is the set of delivery zones and facilities with at least one city carrier route." Petition, Proposal Two at 19. Please indicate the percentage and/or actual number of delivery zones and facilities in the network that do not have any city carrier routes.

RESPONSE:

The percentage of all delivery zones that do not have any city carrier routes is 70 percent. This reflects that most ZIP Codes consist of small offices that have only rural routes or other non-city modes of delivery.

- **10.** The Postal Service states, "large zones have six or more city carrier routes." *Id.*
 - a. Please provide the overall number of large zones in the network and indicate the proportion of zones with more than six routes.
 - b. Please indicate the maximum number of routes in a zone.

RESPONSE:

There are about 7,400 zones with six or more city carrier routes, which form 67 percent of total number of zones in DOIS. The maximum number of city carrier routes in a zone is 74.

- 11. The Postal Service states that for morning tests, "[t]he number of workhours recorded in DOIS in the preceding four weeks is used to order the [large] zones, and a systematic random sample is drawn to select zones in proportion to the number of hours." *Id.*
 - Please explain the reasons for choosing systematic random sampling, rather than simple random sampling or stratified random sampling.
 - b. Please specify the sampling interval and sample size selected for systematic random sampling.
 - c. Please explain why the Postal Service relies on the data for the four-week period.

RESPONSE:

a. Systematic random sampling is used rather than simple random sampling or stratified random sampling to help control the data collection workload by district. After sorting zones by district and weighting by the number of DOIS workhours, the number of tests scheduled for each district is approximately the same in each quarter. Simple random sampling would have more variation in workload within each district. Systematic sampling makes it easier for each district to manage data collection resources each quarter.

Stratification can improve sampling when primary sampling units (PSUs) are heterogeneous, and can help ensure that subcategories of PSUs receive an adequate number of samples. However, carrier activities and mail handled do not vary greatly by zone, so there is little benefit to stratification in this case.

b. The large zones have a sample size of 1,000 tests per quarter. The sampling interval is calculated based on the workhours from the preceding four weeks, i.e.

n = workhours / 1000.

The total population workhours are divided by 1,000 and the delivery zone with every nth workhour is selected.

c. The objective is to measure the size of each zone, based on carrier workhours, to provide the basis for "probability proportional to size" (pps) sampling. A four-week period is sufficiently long that it avoids short-term fluctuations in the number of workhours, and it is sufficiently short that it avoids longer-term changes in workhours arising from structural changes in delivery operations.

The Postal Service states that for morning "large-zone tests, the [IOCS Computerized On-Site Data Entry System] software randomly selects six carriers from the set of available carriers." *Id.* at 19-20. Please explain the reasons for choosing a sample size of six carriers and include any applicable statistical documentation with your response.

RESPONSE:

The design of using six carriers is a compromise among multiple constraints and objectives. First, sufficient time must be provided so that the data collector can find the sampled employee, obtain a mailpiece and record data. Within the context of a delivery unit, five minutes was selected as a sufficiently long interval to conduct a reading in most situations. Five minutes is also a convenient interval that makes it easier for the data collector to remember on which minute to conduct a reading. While four minutes would obtain more data during a test, and six minutes would reduce the percentage of time where no mailpiece could be obtained and recorded, both of these options would make it more difficult for the data collector to determine the minute on which to conduct the reading.

At the same time, it is recommended not to sample the same individual too frequently, as they may mistake data collection related to IOCS for a type of personal performance monitoring. Therefore, in general, we avoid conducting more than one reading on the same employee within a 30 minute period. With readings every five minutes, at least six carriers should be available for sampling.

There is one further advantage to minimizing the number of carriers sampled.

While finding carriers while they are casing mail is not too difficult, it is much more challenging to identify a carrier with whom you are not familiar if that carrier is away

from their case, such as in the parking area. Subsampling only six carriers will usually provide the data collector the opportunity to conduct their first reading on each carrier while they are still at their case. This will make it easier and faster for the data collector to identify each carrier when they are in the parking area or otherwise away from their case.

13. The Postal Service states that for the afternoon tests, "[30] carriers are randomly selected from IOCS panel offices with the district." *Id.* at 23. Please explain the reasons for choosing a sample size of 30 carriers for the afternoon tests and include any applicable statistical documentation with your response.

RESPONSE:

Thirty readings was selected as a reasonable number that could be conducted in a one-hour time block. At the same time, the number of carriers in the subsample list should not be too large because the subsample readings are grouped by finance number. If there were an excessively large number of carriers in the subsampling list, much larger than could be sampled in one hour, most of the samples could be spent on a very small number of finance numbers, while carriers from the majority of finance numbers would not be sampled.

In practice, the median number of readings conducted has been 24, with 30 percent of tests conducted a full 30 readings. The table below summarizes some of the percentiles of the number of readings conducted during FY18Q1¹⁹.

¹⁹ Data are summarized only from FY18Q1 because that version of the data collection instrument grouped readings by finance number, which will be the procedure used in the future.

Number of readings conducted in IOCS-Cluster afternoon tests

Level	Quantile	
100% Max	30	
99%	30	
95%	30	
90%	30	
75% Quartile 3	30	
50% Median	24	
25% Quartile 1	19	
10%	14	
5%	12	
1%	7	
0% Min	3	

14. The Postal Service provides "the proposed numbers of tests by each sampling mode, and the projected number of non-stop readings that are expected from each mode." *Id.* at 8. Please also provide the total number of annual carrier readings (including stop readings) that the Postal Service anticipates to obtain under the proposed IOCS-cluster design.

RESPONSE:

Table: Projected number of readings by reading category, by sampling mode

Sampling Mode	Propose d number of tests per year	Projected number of non- stop readings per test	Projected number of non-stop readings per year	Projected number of total readings per test	Projected number of readings per year	Sampling Efficienc y
AM On-site, stand-alone	4,000	37	148,000	40	160,000	93%
AM On-site, synchronized with CCCS	1,000	10	10,000	12	12,000	83%
PM Telephone	1,000	11	11,000	23	23,000	48%
Total	6,000		167,000		197,000	87%

15. Please provide the IOCS data collector instructions for the data collection and sampling methodology for the proposed IOCS-cluster statistical design. *See id.* at 5-7, 17-21.

RESPONSE:

Instructions for IOCS-Cluster data collectors are provided in folder USPS-RM2018-5/2.

16. The Postal Service states that variances and coefficients of variation (CVs) "are not available at this time." *Id.* at 9. Please indicate when the Postal Service expects variances and CVs to be available.

RESPONSE:

The Postal Service is making progress on developing a program to estimate CVs using the bootstrap approach, and expects results and documentation to be available by the end of July.

The Postal Service indicates that Proposal Two will improve data quality and data collection efficiency. *Id.* at 1-2. The Postal Service also maintains, "IOCS-Cluster has a much higher sampling efficiency." *Id.* at 8. Please explain how the Postal Service measures the levels of data quality, data collection efficiency, and sampling efficiency. Please include any applicable statistical documentation with your response.

RESPONSE:

Sampling efficiency is measured as the percentage of non-stop readings that are used to determine product costs out of all reading attempts. Data from FY18Q1 are compared in the table below and demonstrate the higher sampling efficiency for IOCS-Cluster²⁰.

	IOCS-Cluster	Current (non-cluster)
Number of non-stop readings	34,359	35.528
Total number of readings	45,681	57,799
Percentage of non-stop readings	75%	56%

There is also a significant reduction in the administrative workload required to conduct only 6,000 IOCS-Cluster tests, as compared to 250,000 separate non-cluster readings.

Finally, the data quality improvement is obtained by the use of on-site data collectors, particularly when carriers are in the office and handling mail. On-site data collectors can scan barcodes on pieces, and therefore have the benefit that the data collection instrument can warn if the barcode is inconsistent with the apparent markings,

²⁰ Data from FY17Q4 are not included in this comparison because issues with software and procedures led to the cancellation of a higher number of IOCS-Cluster tests than is expected in the future.

providing an opportunity to improve the quality of recorded data. In current non-cluster IOCS, over 80 percent of city carrier readings, where the carrier is handling a mailpiece, are conducted by telephone, where no barcode is scanned.

- The Postal Service states, "the vast majority of parcels delivered on Sundays and [h]olidays in FY2017 were Parcel Select," and proposes to make the costs accrued for city carriers on Sundays and holidays 100 percent attributable. *Id.* at 9.
 - a. Please indicate the percentage of parcels delivered on Sundays and holidays in FY 2017 that were not Parcel Select.
 - b. Please confirm that the Postal Service delivered only parcels on Sundays and holidays in FY 2017. If not confirmed, please identify the delivered mail products and provide their shares in the overall mail volume delivered on Sundays and holidays.

RESPONSE:

- a. The exact percentage of parcels delivered on Sundays and holidays in FY17 that were not Parcel Select is provided under seal as attachment to the Preface of USPS-RM2018-5/NP2. Note that this includes mailpieces that are not parcel-shaped, but do have an IMpb and are treated the same as parcels.
- b. Not confirmed. Occasionally, carriers deliver non-parcels on Sundays and holiday, including mailpieces that are not parcel-shaped and that do not have an IMpb barcode. However, the volumes of such non-parcel delivery are thought to be very small, and occur primarily during peak season. Because these non-parcel pieces do not have barcodes that are scanned by carriers, data on the share of overall mail volume is unavailable.

19. The Postal Service states that in the afternoon, "carriers are typically not handling mail" and that "telephone readings can continue to be an adequately reliable (as well as cost-efficient) approach." *Id.* at 11. Please indicate the difference in the total annual or daily costs associated with obtaining the IOCS city carrier readings between the current and proposed methodologies.

RESPONSE:

In current IOCS, there are about 100,000 readings on individual carriers in the afternoon per year. If it takes at least 10 minutes per individual reading, a conservative assumption given the additional administrative time needed for each reading, this works out to over 16,000 workhours. In the proposed methodology, there would be 1,000 cluster phone tests in the afternoon, which would take less than 1,500 workhours, a considerable reduction.